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# Forest Insect & Disease Management /

AN AERIAL SURVEY OF SPRUCE BUDWORM  
DEFOLIATION ON THE SUPERIOR NATIONAL FOREST, MINNESOTA 1981

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## INTRODUCTION

The present outbreak of spruce budworm, Choristoneura fumiferana (Clemens), has been active on the Superior National Forest since its detection in 1967 (Miller 1968, Erickson and Hecht 1972, Erickson et. al. 1973). Budworm population levels have fluctuated on the Superior since 1911 (Graham and Orr 1940). The 1981 aerial survey indicates that population levels have increased slightly over 1980 aerial survey results.

## OBJECTIVE

The objective was to record spruce budworm defoliation and other aerially detectable forest pest damage on the Superior National Forest.

## METHODS

A cooperative aerial survey by Forest Pest Management and the Minnesota DNR was conducted on June 30 and July 1, 1981. All signs of pest defoliation and/or damage were sketchmapped. A Cessna 182 was flown 1000 to 1500 above ground at an airspeed of 100 miles per hour. Flight lines were flown in east-west directions at 3-6 mile intervals depending on host type (spruce-fir) and visible defoliation. Two types of maps were used during the aerial survey: 1) U.S.D.A. Forest Service half-inch-to-the-mile maps and 2) Minnesota Department of Transportation half-inch-to-the-mile county maps. Observations were made between the hours of 0830 and 1530. The flight crew consisted of a pilot, navigator, and two observers. Ray Dolan of the Minnesota Department of Natural Resources assisted in the aerial phase of the survey. The following codes were used to designate severity of defoliation.

## DEFOLIATION

L-Light, 0-50 percent of crown showing reddish-brown discoloration.

M-Moderate, 51-100 percent of crown showing reddish-brown discoloration.

H-Heavy, 51-100 percent of crown showing reddish-brown and grey discoloration.



## RESULTS

Most of the defoliation was found on the Virginia, Aurora and Isabella Ranger Districts (Figure 1). The areas of heaviest defoliation occurred on the southern portion of the Aurora Ranger District, and the southwest section of the Isabella Ranger District.

Defoliation acreage increased slightly over 1980 figures (Table 1). As in the 1980 survey, defoliation levels were predominately in the light to moderate category. Heavy defoliation increased by 66 percent from 819 acres to 2416 acres. The following table summarizes the aerial survey results and compares them to the 1980 data.

Table 1.--Acreage estimates from aerial surveys of spruce budworm defoliation on the Superior National Forest 1980 and 1981.

Spruce budworm defoliation	1980 Acres	1981 Acres	Net increase or decrease (percent)
Light	9,504	10,747	+12
Moderate	5,632	8,763	+35
Heavy	819	2,416	+66
Total	15,955	21,926	+27

## DISCUSSION AND RECOMMENDATIONS

Of the four Lake States' National Forests flown in the 1981 survey (Superior, Ottawa, Nicolet, and Chequamegon) only the Superior National Forest had an increase in spruce budworm activity. Compared to the 1980 aerial survey, budworm defoliation increased by 27 percent on the Superior. Large areas of heavy defoliation should be groundchecked by National Forest personnel to determine amount of mortality and feasibility of salvage operations.

Also detected were areas of aspen defoliated by the forest tent caterpillar, Malacosoma disstria (Hubner). Areas of aspen defoliation were mapped in an earlier cooperative aerial survey between the Minnesota DNR and Forest Pest Management. Defoliation varied from light to heavy, with the heaviest defoliation found on the Aurora Ranger District.

Because spruce budworm populations may continue to increase, we recommend that surveillance be continued and that a detection survey be conducted in 1982.



#### LITERATURE CITED

- Erickson, Glen, Keith Hanson, A.R. Hastings and H.V. Toko  
1973. Spruce Budworm Defoliation, Egg Mass and Damage Surveys on the Superior National Forest - 1973. USDA Forest Service, Northeastern Area, State & Private Forestry, Forest Pest Management Report No. S-11-73.
- Erickson, Glen and Gerald Hecht  
1972. Spruce Budworm Defoliation on the Superior National Forest-1972. USDA Forest Service, Northeastern Area, State & Private Forestry, Forest Pest Management Report No. S-72-6.
- Graham, S.A. and L.W. Orr  
1940. The Spruce Budworm in Minnesota. University of Minnesota Agriculture Experiment Station Technical Bulletin No. 142.
- Millers, I., G.W. Erickson, and A.R. Hastings  
1968. Biological Evaluation of the Spruce Budworm on the Superior National Forest - 1968. USDA Forest Service, Northeastern Area, State & Private Forestry, Forest Pest Management Report No. S-68-11.
- Rush, Peter A., A. Steven Munson and Robert P. Ford  
1981. Evaluation of a loss assessment Survey Method for Spruce Budworm Killed Spruce-Fir in the Lake States, 1980. USDA Forest Service, Northeastern Area, State & Private Forestry, Forest Pest Management Unpublished Office Report.